Amendments to the Specification

THESE AMENDMENTS ARE MADE TO THE APPLICATION AS FILED AND PUBLISHED:

Please **replace** the paragraph beginning at page 1, line 5 with the following **rewritten** paragraph:

~~-- This application claims the benefit of U.S. Provisional Application No. 60/439,093, filed January 9, 2003.~~

This application claims the benefit, under 35 U.S.C. § 365 of International Application PCT/US04/00511, filed January 9, 2004, which was published in accordance with PCT Article 21(2) on July 29, 2004 in English and which claims the benefit of United States provisional patent application No. 60/439,093, filed January 9, 2003. --

Please **replace** the paragraphs beginning at page 1, line 13 with the following **rewritten** paragraphs:

--The present invention is in the context of WLAN specifications defining conventional local area network access points, which provide radio communication to mobile devices and other networks, such as hard wired local area networks and global networks, such as the Internet. Wireless receiving points utilized in conditional access broadcasting may include a ~~settop~~ set top box in a simple system, whereas in commercial rebroadcast systems a transcoder / multiplexer/demultiplexer (TMD) may operate in conjunction with a local video server.

FIG. 1 illustrates an exemplary digital video and audio system suitable for implementing the present invention. At the head end a multiple video and audio content stream is converted into a digital format (typically in accordance with the MPEG-2 standard) and transmitted via satellite to a receiving dish, or other suitable means, which is attached to a receiver referred to as a set top box or other suitable means such as a TMD. U.S. Patent 6,510,519, describes a representative system utilizing a ~~headend~~ head end and a set top box including tuners, de-modulators, decoders, transport de-multiplexers, microprocessors, program memories, video picture memories, MPEG video decoders, displays, and smart cards. Most digital broadcast system data streams are encoded and scrambled for security purposes at a

transmitter; once decryption and decoding occur at a receiver, the system builds a video composite picture in memory and displays the desired picture synchronized with its audio component on a monitor. In addition to descrambling the program, generally, further authorizations are provided to insure that the particular receiver has been enabled to receive a program or a set of programs.

As further illustrated in Fig. 1, the TMD 123 operating in conjunction with a local video server may be designed and configured to further communicate with a video LAN and a wireless access point (AP) 145, which in the illustrative example provides down line receivers with demultiplexed video and audio transmission streams including synchronized signals necessary for the transmission of the video and audio content. --

Please **replace** the paragraphs beginning at page 4, line 2 with the following **rewritten** paragraphs:

-- In the present invention, a novel mapping from an MPEG-2 TS to IP-based RTP/UDP/IP stack for broadcasting service in a WLAN permits all mapping functions to be performed in a receiver such as a TMD. The invention provides an apparatus and a method for mapping an MPEG-2 transport stream into IP protocols to serve IP based MPEG-2 broadcasting services for efficient distribution over an IP network such as a WLAN, of programs contained within a transport stream, to a final destination for video and audio presentation. The invention performs a preprocessing with the transport stream, including demultiplexing and mapping of MPEG-2 formatted data prior to distribution over the wireless network, enabling each intended wireless receiver to determine a specific program and thereby process only the packets associated with a specific program, rather than receive and process every program available in the transport stream. The invention has the benefit of reducing the bandwidth required to transmit the entire MPEG-2 transport stream. Furthermore, demultiplexing within the network allows re-coding of the MPEG-2 program streams at desired bit transmission rates.

The invention disclosed herein includes a means for receiving a transmission stream having data formatted into distinct packets that includes at least one PID and associated PSI (mainly PAT, PMT and CAT data); a means for demultiplexing the PSI based upon the associated PID assignments to unique transport packets; a means for reassembling the PSI in accordance with a RTP data flow; a means for

encapsulating the RTP data stream into IP packets with a multicast address; and a means for communicating a reassembled transport stream over a WLAN. As such the invention may be embodied in any media server (referred to generally as a transcoder) capable of satisfying the means associated with the invention. Such media servers may include ~~such~~ devices such as TMDs, ~~settop~~ set top boxes, and wireless access points as defined under the IEEE 802.11 standard.

The invention further discloses a means for communicating that comprises a video WLAN, and the means for reassembling the PSI including a means for inserting a multicasting IP address for each associated PMT. Once the PMT has had the multicasting IP address inserted the invention includes ~~calculates~~ calculating a corresponding cyclical redundancy check or CRC. In one embodiment, the PSI is formed from the PAT and the PMT whereby the PSI contains a descriptor field, in which the multicasting IP address is stored. The PSI also contains a feature referred to as a null flag to indicate that the state of the PSI remains unchanged from the prior transmission. In the event that the PSI had changed from the prior transmission the state of the flag is changed to indicate that the PSI state has changed.--

Please **replace** the paragraph beginning at page 5 line 10 with the following **rewritten** paragraph:

-- An embodiment of the invention disclosed herein includes a method for mapping MPEG-2 into an IP-based RTP/UDP/IP stack comprising the steps of: receiving a transmission stream having data formatted into distinct packets that includes at least one PID and associated PSI; demultiplexing the PSI based upon PID assignments to unique transport packets; and reassembling the PSI in accordance with a RTP data flow; encapsulating the RTP into a multicast address; and calculating a corresponding CRC. --

Please **replace** the paragraph beginning at page 5 line 26 with the following **rewritten** paragraph:

-- An embodiment of the present invention also includes a computer readable medium for mapping an MPEG-2 formatted transport stream into an IP-based RTP/UDP/IP stack having stored thereon one or more data structures selected from the group comprising of distinct packets that includes at least one distinct packet that includes at least one first field containing an IP multicast address, a second field

representing the PAT and associated PMT (1); a third field containing the RTP head and a fourth field a containing a program. --

Please **replace** the paragraphs beginning at page 7, line 9 with the following **rewritten** paragraphs:

-- The prior art in FIG.1 illustrates in overview a digital broadcast system 100 that supplies ~~audiovisual~~ audio visual programming. All digital broadcast system data streams contain video, audio, timing information which are encoded or scrambled for security purposes, that is to insure only authorized subscribers can view the programs transmitted.

In a digital broadcast system, the customer receives, in addition to the video and audio information, various administrative and control messages such as entitlement control messages, which contains an exploitation key necessary to decrypt the encrypted control word necessary to decode a descrambling key so as to permit the decryption and assembling of the digital video and audio data. Once decryption occurs, the system builds a video composite picture in memory, typically in accordance with the MPEG-2 standard, and displays the desired picture on a display.

In accordance with FIG. 1, a Head End 110 digitally formats video and audio content 116, utilizing a subsystem 113 that includes an encoder, packetizer and multiplexer, which is then modulated with modulator 114, so as to be transmitted from a ~~transmitter102~~ transmitter 102 via satellite 104 to a receiving dish 106 located at a receiving end for television service to conditional access customers. --

The receiving end typically is a TMD 123 operating in conjunction with a local video server 120, which electronically connects to the receiving dish 106. The TMD 123 contains a demodulator (not shown) that demodulates the received signal and outputs the demodulated signal to a central processing unit (not shown) that processes the many packetized streams by routing selected packets to various control, data and status subsystems. For example, typically the selected packetized video and audio stream is sent to a transcoder (not shown) for translation into a format suitable for output to a wireless station 140, which serves as the receiving device for devices such as a television 150 operating in accordance with NTSC, PAL or SECAM formats, or laptop computer, cell phone or personal digital assistance (PDA) all in accordance with IEEE 802.11, or other applicable wireless networking standards. A

wireless receiver device may be representative of wireless station 140, which, may in turn, depict a mobile device such as a laptop computer, or a cell phone or PDA device. Therefore, stations may be mobile, portable, or stationary and all stations that are IEEE 802.11 compliant provide for services of authentication, de-authentication, privacy, and data delivery. Other WLAN devices, such as HiperLan 2 may be used for the purposes of wireless transmission.--

Please **replace** the paragraphs beginning at page 8, line 7 with the following **rewritten** paragraphs:

-- With reference to FIG. 1 and FIGs. 2, the process of generating an MPEG-2 TS from uncompressed video and audio begins with a plurality of programs 202 in the head end 110. Each of the programs 202 consists of at least one uncompressed elementary video signal 230 and one uncompressed elementary audio signal 232. Multiple video (e.g. for different viewing perspectives) and audio (e.g. for different languages) elementary streams in a program ~~104~~ 212 is permissible within the current commercial broadcast conventions. Each of the digitized audio and video signals of a program 202 are processed by the encoders consisting of a video encoder 233(a) and an audio encoder 232(b); packetized 234(a), 234(b) and multiplexed 235 so as to incorporate associated Program Specific Information (PSI) 203a, including Program Association Table (PAT) 205a, Program Map Table (PMT) 206a, Network Information Table (NIT) 208~~a~~ and Conditional Access Table (CAT) 210. The multiplexed 235 transport stream packets 236 includes specific program information among the plurality of programs 202. Each transport packet belongs to a particular elementary stream (either a video, audio or PSI 203a). ~~The packet identifier (PID) 204a is used to address each corresponding elementary stream.~~

The assembled transport stream packets 236 as produced by subsystem 113 ~~is~~ are modulated with the appropriate carrier signals by modulator 114 for transmission and broadcast in the MPEG-2 TS format. Those skilled in the art of broadcast communications will recognize that alternatively the transport stream packets 236 may be broadcast via a local multimedia server and associated transmission lines (unshown).

The TMD 123 receives the transport packet 105 (FIG. 2A) in the MPEG-2 TS format, which contains PSI 203a information such as the different tables that provide information about the programs 202 transported in the transport stream packets 236.

~~A~~ Referring to FIG. 2A, demultiplexing process 240 disassembles and reassembles in a hierarchical relationship a ~~PAT 205b~~ PAT 205a ~~corresponding to the PAT 205a,~~ several PMTs 206b (FIG. 2B) corresponding to the PMT 206a and the programs 202 that the transport stream 236 carries. A PAT is always identified by PID=0. In the ~~PAT 205b~~ PAT 205a, all the programs such as program 202 (1), 202 (2) through 202 (n) are listed. Furthermore, each program is associated with a specific PMT 206b, ~~whose PID 204b corresponding to PID 204a~~ is associated with the program 202 in the ~~PAT 205b~~ PAT 205a. --

Please **replace** the paragraph beginning at page 9 line 6 with the following **rewritten** paragraph:

-- Having reassembled in the demultiplexer 240 (FIG. 2A) a hierarchical relationship (PSI) 203b, which includes the (PAT) ~~205b~~ 205a, (PMT) ~~206b~~ 206a, (NIT) ~~208ba~~ 208 and all the elementary streams 212 for WLAN broadcasting service, the TMP 123 maps each broadcasting elementary stream 212 of a program 202b into a RTP traffic data flow. The RTP packets 249 are encapsulated in multicasting addresses such as, by way of illustration, multicasting IP addresses 250, 252. Those skilled in the art of Internet communications will recognize these as Class D IP addresses. The multicasting addresses 250, 252 are used to transmit elementary streams as announced by the packets 249 over a WLAN 160. --

Please **replace** the paragraph beginning at page 9 line 22 with the following **rewritten** paragraph:

-- To ensure that all the hosts connecting to the wireless broadcast access point 145 receive the PSI 203a for program selection, the PSI 203a must be sent with the audiovisual streams to aid users in choosing broadcasting programs. There are two approaches that achieve this objective. --

Please **replace** the paragraph beginning at page 9 line 30 with the following **rewritten** paragraph:

--When a multicasting IP address 250,252 is inserted into the PMT 206b, additional byte space is required to store the multicasting IP address 250,252. The descriptor field 253 in the PMT 206 can be used to store and carry the multicasting IP address 250,252. After inserting the multicasting IP address in the PMT 206b, the

CRC 257 for the PMT 206b must be re-calculated due to the modification of the PMT 206b. The PAT ~~205b~~ 205a and the PMT 206b information are processed to form the new program specific information PSI packets 254 carried in a UDP/IP format using a well-known multicast address 250. --

Please **replace** the paragraph beginning at page 10 line 9 with the following **rewritten** paragraph:

-- To reduce the receiver processing time, when such program information remains unchanged during sequestial transmission of TS, (no changes in PAT and PMTs), a reserved bit 256 in a PSI packet 251, may be borrowed as a new flag 256, which according to its state indicates that the PSI and others remain the same or has changed since the immediately prior transmission. If any changes have occurred since the last transmission, the new flag 256 is set. Otherwise, the new flag 256 state remains unset. --

Please **replace** the paragraph beginning at page 10 line 30 with the following **rewritten** paragraph:

-- In mapping video and audio TS packets, transport packet headers are eliminated during the mapping due to the redundant fields in both TS header 239 and RTP header 260. In the TS header, the relevant field for a broadcast is a continuity counter and Program Clock Reference (PCR). A PCR is inserted in an adaptation field of a TS header 239 wherein the adaptation ~~filed~~ field is optional. The continuity counter is used for a receiver to detect any packet loss. However, a field called sequence number is specified in the RTP header 260, which plays a similar role. The PCR is used to precisely synchronize the clocks of receiver and transmitter in a constant delayed network. This clock synchronization may be simplified in other means such as a timestamp in the RTP header 260. --

Please **replace** the paragraph beginning at page 11 line 24 with the following **rewritten** paragraph:

-- In referring to ~~FIG. 2~~ FIGS. 2 an embodiment of the invention includes a computer readable medium 250, 252 for mapping an MPEG-2 formatted transport stream packet ~~237~~ 236 into an IP-based RTP/UDP/IP stack 252 having stored thereon one or more data structures selected from the group comprising of distinct packets

that includes at least one distinct packet that includes at least one first field containing an IP multicast address ~~254~~ 250, a second field ~~251a~~ representing the PAT 251 and at least one associated PMT such as PMT 258 (1);a third field such as 260 (1)a containing data representing the RTP head 260 (1) and a fourth field 262a containing data representing a program such as 262 (1). --